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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,899	02/27/2004	Kevin Torek	303.866US1	4587

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EXAMINER	
ALANKO, ANITA KAREN	

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/788,899	TOREK, K ET AL	
	Examiner	Art Unit	
	Anita K. Alanko	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/29/05 election*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/5/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Election/Restrictions

Applicant's election without traverse of Group I in the reply filed on August 29, 2005 is acknowledged.

Information Disclosure Statement

Some of the references on the IDS filed on August 5, 2004 have been lined through and have not been considered. They are classified in unrelated classes and appear unrelated to the claimed invention.

Claim Rejections - 35 USC § 112

Claims 4-7, 10-11, 17 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 4-6, 10-11 and 28, the term "selected from" should cite - - selected from the group consisting of" if applicant intends to recite a Markush group. Alternative language such as - - etching is a vapor or a dry process - - may also be used. As the claims now read, for example as to claim 4, the second non-wet etching comprises both a vapor and a dry process.

In claim 4, it is unclear how the first wet etching may comprise a vapor process, and therefore the metes and bounds of the claim are unclear.

It is unclear how claim 7 further limits its base claim since the claim does not cite that the etching chemistries are different, and "first wet etching" inherently includes a "first etch chemistry" and "second non-wet etching" inherently includes a "second etch chemistry".

In claim 17, the phrase describing the dielectric first film in line 3 is unclear. For the purposes of the rejection, claim 17 is treated as citing "wherein the dielectric first film is vapor deposited".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 46-50 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Kang et al (US 2004/0175884 A1).

Kang discloses a process comprising:

forming a recess 251 in a dielectric stack 180, 200, 220, 240 (Fig.3D-3E);

forming a conductive structure 260 in the recess (Fig.3F), wherein the conductive structure is partially embedded in the recess (see Fig.3G), and wherein the conductive structure is formed to extend from the first dielectric stack (Fig.3G); and

electrically isolating the conductive structure (the CMP step as shown in Fig.3F).

As to claims 47-50, Kang discloses to form storage cell dielectric film 280 and a storage cell plate 300 (Fig.3H).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al (US 2004/0175884 A1).

The discussion of Kang from above is repeated here.

As to claim 50, Kang fails to disclose how the storage cell dielectric film is formed. Examiner takes official notice that CVD is a conventional deposition process. It would have been obvious to one with ordinary skill in the art to deposit by CVD in the method of Kang because it is a useful, conventional method for depositing layers.

Claims 40-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al (US 2004/0175884 A1) in view of Jost et al (US 5,966,611).

The discussion of Kang from above is repeated here.

As to claim 40, Kang discloses to embed a conductive structure (polysilicon, [0043]) within a dielectric stack, wherein the conductive structure is coupled to a substrate active area (Fig.3G).

Kang fails to disclose stripping amorphous carbon. Rather, Kang discloses that the sacrificial material 220 comprises a silicon oxide (Fig.3E, [0045]).

Jost teaches that when exposing polysilicon structures by removing a sacrificial layer, that the sacrificial layer may comprise either an organic material (such as amorphous carbon) or an inorganic material (such as silicon oxide) (col.3, lines 43-48).

Therefore, it would have been obvious to one with ordinary skill in the art to use amorphous carbon as the sacrificial layer in the method of Kang because Jost teaches that it is a useful, alternative sacrificial layer for silicon oxides when exposing polysilicon structures.

Kang fails to disclose the aspect ratio of the conductive structure. Since the same steps are conducted as in the instant invention, the same result is expected and the aspect ratio is expected to be similar to the cited range. Kang teaches that it is desired to have deep trenches in order to integrate capacitors that can store sufficient electric charge ([0005]-[0007]), therefore the aspect ratio appears to reflect a result-effective variable. It would have been obvious to conduct the method with the cited aspect ratio in the modified method of Kang because the aspect ratio appears to reflect a result-effective variable that can be optimized. See MPEP 2144.05 IIB.

As to claim 41, Kang discloses that the structure is a container capacitor. The modified method of Jost has amorphous carbon as the sacrificial layer. Jost teaches that oxygen plasma stripping is a useful technique for removing amorphous carbon (col.4, lines 9-14 and 61-63). It would have been obvious to one with ordinary skill in the art to use oxygen plasma stripping in the modified method of Kang because Jost teaches that it is a useful etchant for removing amorphous carbon.

As to claims 42-45, Kang discloses a polysilicon sacrificial second film 240 as a hard mask, which acts as a sacrificial second film disposed above and on the first sacrifical film (amorphous carbon in the modified method of Kang), since the mask is not present in the final product. Examiner takes official notice that oxides are conventional hard mask materials, and BPSG and TEOS-decomposed are conventional oxides. For example, Jost teaches that silane oxides are known (col.3, lines 46-47) and Kang teaches that PSG is known ([0043]). It would have been obvious to use oxides such as BPSG or TEOS in the modified method of Kang because they are useful, conventional hard mask materials.

Claims 1-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al (US 2004/0175884 A1) in view of Jost et al (US 5,966,611) and O'Brien (US 5,817,182).

The discussion of modified Kang from above is repeated here.

As to claims 1, 9, 22 and 29, the modified method of Kang, as discussed above, comprises first wet etching and second non-wet etching. Kang does not explicitly disclose first rinsing the conductive structure. However, Kang does disclose that since the conductive structure is embedded, that tilting caused by cleaning ([0017], Fig.2) can be prevented ([0018]).

O'Brien teaches that it is useful to rinse after etching in order to remove etchant residues that may impact subsequent processing, device yield or reliability (col.4, lines 8-13). It would have been obvious to rinse after exposing the conductive structure in the modified method of Kang because O'Brien teaches that it is useful to rinse after etching in order to remove etchant residues that may impact subsequent processing, device yield or reliability, and Kang teaches that problems caused by cleaning can be prevented.

The various layers of oxides and polysilicon cited in the dependent claims are obvious to include since Jost teaches that various inorganic layers are useful, including silicon oxides and silane-oxides (col.3, lines 45-47), O'Brien teaches some useful oxides (col.1, line 50), and Kang discloses that the polysilicon may be doped or undoped ([0043]).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art shows methods of forming conductive structures within recesses.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K. Alanko whose telephone number is 571-272-1458. The examiner can normally be reached on Mon-Fri until 2:30 pm (Wed until 11:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anita K. Alanko

Anita K Alanko
Primary Examiner
Art Unit 1765